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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/774,691

02/10/2004

Tuomo Lehtonen

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7362

32294

7590

04/26/2006

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EXAMINER

CHAPMAN JR, JOHN E

ART UNIT

PAPER NUMBER

2856

DATE MAILED: 04/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/774,691	LEHTONEN, TUOMO	
	Examiner	Art Unit	
	John E. Chapman	2856	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 March 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3,17,19-22,24 and 26-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,17,19-22,24 and 26-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on March 20, 2006 has been entered.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
3. Claim 31 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The specification does not adequately teach how to linearize the output of the acceleration sensor with respect to a change in capacitance by selecting a number of pairs of electrodes and their orientations.
4. Claims 1, 3, 17, 19-22, 24 and 26-31 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 1, the import of "the position of the at least one pair of electrodes is selected symmetrically in relation to an axis or axes of symmetry" in lines 9-10 is unclear. At

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that point in the claim (i.e., lines 9-10), there is antecedent basis for only “at least one pair of electrodes,” i.e., one or more pairs of electrodes. But if there is only one pair of electrodes, then it is not clear what it means to be “selected symmetrically in relation to an axis or axes of symmetry.” It is not clear how a single pair of electrodes can be “selected symmetrically in relation to an axis or axes of symmetry,” since the axes of symmetry appear to be defined in terms of a plurality of pairs of electrodes. Note paragraph 47. While a plurality of pairs of electrodes is introduced in lines 11-13, it is not clear whether the position of one or all the pairs of electrodes are “selected symmetrically in relation to an axis or axes of symmetry.” It would appear that the limitation in lines 9-10 should follow the introduction of “more than three pairs of electrodes” in line 11. Furthermore, the limitation should make clear how many of the pairs of electrodes are “selected symmetrically in relation to an axis or axes of symmetry.”

Regarding claim 3, it is improper to use the term “comprising” instead of “consisting of.” See *Ex parte Dotter*, 12 USPQ 382 (Bd App 1931), quoted in MPEP 2173.05(h).

5. Claims 1, 17, 19-22, 24, 26-28 and 30 are rejected under 35 U.S.C. 102(b) as anticipated by Andersson (5,723,790).

Andersson discloses an acceleration sensor comprising four cantilevered beams 1, 2, 3 and 4 with adhering masses of inertia 1', 2', 3' and 4'. Andersson teaches a Type II measuring device in Fig. 5 wherein the masses of inertia 1', 2', 3' and 4' are arranged symmetrically in relation to axes of symmetry and the negative direction vectors (i.e., the directions from the masses of inertia through the support axes of the beams) intersect at essentially one point. The sensor comprises a multi-axis acceleration sensor (column 3, lines 35-37). Andersson further

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teaches that the sensor may comprise a capacitive sensor wherein conductive surfaces are located on opposite sides of the masses of inertia (column 4, lines 1-4). The masses of inertia 1', 2', 3' and 4' comprise movable electrodes that are rigidly supported for rotational motion about the hinge axis of the cantilevered beams 1, 2, 3 and 4.

Regarding claim 19, since the acceleration sensor measures acceleration along three axes (column 3, lines 35-37), it thereby measures acceleration along two axes.

Regarding claim 24, each inertia mass 1', 2', 3' and 4' comprises two pairs of electrodes, since electrodes are located on opposite sides of the masses of inertia. Hence, there are eight pairs of electrodes.

Regarding claim 30, some of the pairs of electrodes are redundant since they measure the same quantity, for example, F_x in Fig. 4.

6. Claims 3, 30 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Andersson.

Regarding claim 3, the only difference between the claimed invention and the prior art consists in the shape of the electrodes. A mere change in the shape of a prior art device is generally recognized as a design consideration within the skill of the art. *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

Regarding claim 30, it would have been obvious to provide redundant sensors in case one sensor should become inoperative.

Regarding claim 31, it is well known within the art to provide linearization in order that the output signal is proportional to the input acceleration.

7. Claims 24 and 26-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Andersson in view of Negoro (5,892,154).

Regarding claim 24, insofar as claim 24 recites eight pairs of electrodes, each pair comprising a moveable electrode distinct from the other moveable electrodes, Negoro teaches forming a capacitive acceleration sensor using N acceleration detection devices, where $N \geq 3$ (column 14, lines 19-29). It would have been obvious to one of ordinary skill in the art to choose $N = 8$. Where the prior art discloses a range of values (such as, $N \geq 3$), and there is no showing of criticality of the recited range (such as, $N = 8$), such recited range is generally considered to be obvious to one of ordinary skill in the art. See *In re Reven*, 390 F.2d 997, 156 USPQ 679 (CCPA 1968).

8. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Andersson in view of Cole (4,736,629).

Regarding claim 29, the only difference between the claimed invention and the prior art consists in measuring different ranges of acceleration. Cole teaches forming the beams 148 and 150 such that the beams have different moments about the pedestal, i.e., such that they measure different ranges of acceleration. It would have been obvious in view of Cole to provide the cantilevered beams 1, 2, 3 and 4 of Andersson with different moments so as to measure different ranges of acceleration.

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9. Claims 1, 3, 17, 19-22, 24, 26-28, 30 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mahon (6,862,795) in view of Andersson (5,723,790).

Mahon discloses a capacitive acceleration sensor comprising four movable electrodes 310, 320, 330 and 340 in Fig. 2, the movable electrodes being rigidly supported by torsion members 400 at an axis of rotation. The only difference between the claimed invention and the prior art consists in arranging the movable electrodes 310, 320, 330 and 340 such that the negative direction vectors intersect at essentially one point. Andersson teaches the equivalence of a type I measuring device, such as that in Fig. 2 of Mahon, and a type II measuring device in Fig. 2, wherein the negative direction vectors (i.e., the direction from the inertial masses through the support axis) intersect at essentially one point. It would have been obvious to one of ordinary skill in the art to arrange the movable electrodes 310, 320, 330 and 340 of Mahon in the type II configuration of Andersson in order to reduce sensitivity to angular velocity.

Regarding claim 3, the only difference between the claimed invention and the prior art consists in the shape of the electrodes. A mere change in the shape of a prior art device is generally recognized as a design consideration within the skill of the art. *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

Regarding claim 19, since the acceleration sensor measures acceleration along three axes (column 3, lines 35-37), it thereby measures acceleration along two axes.

Regarding claim 24, each inertia mass 310, 320, 330 and 340 comprises two pairs of electrodes, since electrodes are located on opposite sides of the masses of inertia, as shown in Fig. 22. Hence, there are eight pairs of electrodes

Regarding claim 30, the sensor 330 in Fig. 2 of Mahon is redundant, as evident from Fig. 4A. Furthermore, it would have been obvious to provide redundant sensors in case one sensor should become inoperative.

Regarding claim 31, the sensor cells of Mahon are arranged so as to cancel non-linearities, i.e., so as to linearize the output. See column 2, lines 53-56 of Mahon.

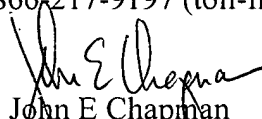
10. Applicant's arguments filed March 20, 2006 have been fully considered but they are not persuasive. Regarding the rejection of claim 31 under 35 U.S.C. 112, first paragraph, applicant argues that paragraphs 53-55 detail how pairs of electrodes can be utilized to linearize the capacitance change. However, paragraph 53 merely states that some of the pairs of electrodes can be used for linearization of the capacitance change. How the pairs of electrodes can be used for linearization of the capacitance change is not evident. There are numerous ways of linearizing the output of an acceleration sensor. The output of the capacitive acceleration sensor can be linearized by the design of capacitor plate geometry, or with suitable electronics, or with computer assisted treatment of the sensor element measurement data. See column 10, lines 31-37 of Holm-Kennedy et al. (5,095,762). How applicant proposes to linearize the capacitance change is not clear. Paragraphs 54 and 55 do not mention linearization. Consequently, it is not clear whether claim 31 is directed to the design of capacitor plate geometry or to additional structure, such as suitable electronics or a computer.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John E. Chapman whose telephone number is (571) 272-2191. If

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attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on (571) 272-2208. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


John E Chapman
Primary Examiner
Art Unit 2856